Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
	)	
Amendment of Part 15 of the Commission's Rules for Unlicensed Operations in the Television Bands, Repurposed 600 MHz Band, 600 MHz Guard Bands and Duplex Gap, and Channel 37, and	)	ET Docket No. 14-165
	)	
Amendment of Part 74 of the Commission's Rules for Low Power Auxiliary Stations in the Repurposed 600 MHz Band and 600 MHz Duplex Gap	)	
	)	
Promoting Access for Wireless Microphone Operations	)	GN Docket No. 14-166
	)	
Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions	)	GN Docket No. 12-268

COMMENTS OF THE NUCLEAR ENERGY INSTITUTE AND UTILITIES TELECOM COUNCIL

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February 4, 2015

SUMMARY

The Nuclear Energy Institute ("NEI") and the Utilities Telecom Council ("UTC"), on behalf of the nation's 100 operating nuclear power plants, urge the Federal Communications Commission ("FCC" or "Commission") to confirm that the nuclear power plants may continue to operate wireless headsets as currently permitted, pursuant to the NEI/UTC Waiver Letter Order, as modified by the Commission in the *Second Report and Order* in WT Docket No. 08-166 (the "Waiver").

The plants also request that the Telex headsets be included in the Commission's definition of "unlicensed wireless microphones" and that the plants be deemed eligible to use this equipment (as well as any future equipment that may be developed to meet this need), under the new Part 15 rules. Finally, NEI and UTC urge that the Commission's proposed restriction on the marketing and sale of wireless microphone equipment operating in the broadcast spectrum include a carve-out to permit the plants to be supplied with such equipment, to be operated in a manner that is consistent with the Waiver.

In the *Second Report and Order*, the Commission declined at that time to expand eligibility under Part 74 of the FCC's rules to include nuclear plants, finding that the Waiver provided the plants sufficient authority to operate. Similarly, the Commission declined to codify the Waiver provisions into Part 15, holding that it was unnecessary to do so prior to considering changes to the Part 15 rules for unlicensed wireless microphone use.

Even with these delays in securing a longer-term solution for the plants' wireless communications requirements, the plants were encouraged by the Commission's earlier finding that "operation of these devices outside at transmit levels up to 100 milliwatts would not interfere with other users in these bands because the locations of nuclear power plants are

known, they are generally located in remote areas, and their Telex equipment operates at a relatively low power."

The factors that led the Commission to authorize the plants to use the wireless headsets under the Waiver remain the same and, given the record developed by the plants in these proceedings - that there is no alternative equipment available that would as effectively function to allow the plants to accomplish their communications requirements in support of worker health and overall plant safety - the plants ask the Commission to confirm the right of the plants to continue to use these wireless headsets, beyond the 39-month transition period, in a manner that is consistent with the Waiver.

While not ideal, the plants can limit their use of the repurposed broadcast spectrum after the 39-month transition period to *indoor operations only*. Given the Commission's finding of non-interference with other users in these bands, the plants respectfully submit that no purpose would be served by limiting the use of these wireless headsets to whatever spectrum happens to remain, post Incentive Auction, for television broadcasting or guard bands in the areas around the plants.

Only with these reasonable accommodations will the plants be able to access sufficient spectrum, on a secondary, non-interfering basis, to operate the wireless headsets that protect worker health as well as promote safe plant operations.

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COMMENTS OF THE NUCLEAR ENERGY INSTITUTE AND UTILITIES TELECOM COUNCIL

The Nuclear Energy Institute ("NEI") and the Utilities Telecom Council ("UTC") on behalf of the operators of the nation's 100 operating nuclear power plants (collectively the "Reactor Licensees"), hereby submit comments in response to the Commission's two Notices of Proposed Rulemaking, released on September 30, 2014 ("NPRMs") in the above-referenced dockets.[1] Among other things, the *Part 15 NPRM* seeks comment on how unlicensed operations,

[1] *Amendment of Part 15 of the Commission's Rules for Unlicensed Operations in the Television*

by wireless microphones and other devices, can be accommodated in the frequency bands that are currently used for television broadcasting following the repurposing of portions of those bands for wireless services.

In these and earlier related rulemakings, the Commission invited comments on a number of issues relating to wireless microphones, including: (i) whether it would serve the public interest to permit a limited expansion of eligibility under Part 74, Subpart H, of the Rules to include Reactor Licensees, and, if so, how such expansion should be defined and managed; (ii) whether the nuclear plants should be treated as a special case, such that these facilities should be entitled to obtain licenses under Part 90 to operate certain low power auxiliary equipment inside the plants, and under Part 74 for outdoor use within each plant's security perimeter, and if so, for what purposes, and (iii) how to ensure the most efficient and effective long-term arrangement for the use of wireless microphones, leveraging technological advances.

Given that the Reactor Licensees' comments in response to the NPRMs rely heavily on their earlier comments in the wireless microphone proceedings, portions of those comments are restated herein. Thus, the Reactor Licensees are reaffirming their need for access to spectrum in order to support the use of Telex wireless headsets and urge the Commission to confirm that nuclear power plants may continue to operate wireless headsets pursuant to the NEI/UTC Waiver

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Bands, Repurposed 600 MHz Band, 600 MHz Guard Bands and Duplex Gap, and Channel 37, and Amendment of Part 74 of the Commission's Rules for Low Power Auxiliary Stations in the Repurposed 600 Hz and 600 MHz Duplex Gap, Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions, ET Docket No. 14-165, GN Docket No. 12-268, Notice of Proposed Rulemaking, 29 FCC Rcd 12248 (rel. Sept. 30, 2014) ("*Part 15 NPRM*") and *Promoting Access for Wireless Microphone Operations, Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, GN Docket No. 14-166, GN Docket No. 12-268, Notice of Proposed Rulemaking, 29 FCC Rcd 12343 (rel. Sept. 30, 2014) ("*Wireless Microphone NPRM*"). These comments are being filed in response to both the *Part 15 NPRM* and the *Wireless Microphone NPRM* due to the overlap in subject matter.

Letter Order,[2] as modified by the Commission in the *Second Report and Order*.[3] The Reactor Licensees also suggest specific relief for their continued use of the wireless headsets based upon the unique operating environments of nuclear power plants and the Commission's previous findings that these devices are extremely unlikely to cause harmful interference to other spectrum users.

I. Background.

For over a decade, because of the lack of alternative equipment that can as efficiently and effectively manage the communications requirements in the unique conditions found inside the nuclear plants, the FCC has allowed the Reactor Licensees to operate Telex wireless headsets in order to protect worker health as well as promote safe plant operations. The Reactor Licensees have tested thirty-seven (37) potential alternatives for indoor operations. None of them have come close to providing the same level of hands-free use, reliability, clarity, full-duplex/multi-user/background noise reduction capabilities, and durability that the Telex equipment has provided. In most cases, the potential alternatives drop calls, or cannot reliably operate inside the environment of thick cement and steel walls, as well as densely packed, large equipment. Some nuclear plants also have a substantial portion of the reactor underground and the containment often is constructed with a domed ceiling.[4]

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[2] Request to Modify Condition on Waiver Granted in ET Docket No. 10-24, Letter from Julius Knapp, Chief, OET, FCC, and Ruth Milkman, Chief, WTB, FCC, to J. Jeffrey Craven, 25 FCC Rcd 13744 (OET and WTB 2010) ("NEI/UTC Waiver Letter Order"), attached hereto as Attachment A.

[3] *Revisions to Rules Authorizing the Operation of Low Power Auxiliary Stations in the 698-806 MHz Band, et al.*, WT Docket Nos. 08-166 and 08-167, ET Docket No. 10-24, Second Report and Order, 29 FCC Rcd 6103 (rel. June 2, 2014) ("Second Report and Order").

[4] *See, NEI/UTC Petition for Waiver*, WT Docket No. 09-176 (filed Sept. 23, 2009)("Petition for Waiver.").

Indeed, the wireless signals of several of the potential alternatives tested by the Reactor Licensees reflect off of the reactor containment buildings' domed ceiling, resulting in signal deterioration and/or unacceptable levels of interference with themselves and with the other communications devices (including the dosimeters), operating at higher frequencies. The Telex equipment does not incur these problems. As noted herein, the surveys of the Reactor Licensees, taken over the past ten (10) years, demonstrate that none of the thirty-seven (37) potential alternatives was deemed to be an adequate replacement for the Telex headsets.

Also, inside the plants, careful engineering is required to avoid conflicts among sensitive electronics used to monitor and control plant operations. For example, workers must wear dosimeters that track exposure to radiation during outages and maintenance work in high radiation areas, at the same time as they wear the Telex headsets. Most of the major dosimeter devices generally operate at higher frequencies that interfere with other hands-free, wireless communications device tested, except Telex. Even more importantly, in the past, certain wireless telecommunications equipment interfered with the plants' electric motors, as well as pneumatic cylinder actuators and hydraulic cylinder actuators, causing the spurious actuation. Obviously, this sort of plant evolution must be carefully controlled.

Telex headsets operate at exceedingly low power (not exceeding 100 mW) on frequencies in the current broadcast television band. The FCC allowed the Reactor Licensees to operate the equipment indoors without meeting the distance separation to co-channel broadcast stations, which would otherwise be required for other television auxiliary and wireless microphone use, and without a requirement for frequency coordination. This operation was initially authorized after the Reactor Licensees reached a consensus plan with the television broadcast industry associations and more recently pursuant to a Commission waiver of Part 15,

granted in October 2010 (the "Waiver").[5] In granting the Waiver, the Office of Engineering and Technology and the Wireless Telecommunications Bureau noted that it would serve the public interest to allow use of Telex headsets inside nuclear power plants "by ensuring that personnel working inside these plants have essential equipment for critical communications." They also cited to the fact that "these devices employ relatively low power and nuclear power plants are physically separated from receivers that could potentially receive interference."[6]

The flexibility shown by the Commission in this regard has saved countless plant workers from extended radiation exposure, giving them access to a two-way, hands-free wireless communications system that provides clear, uninterrupted communications within the very challenging environment of a nuclear plant. Over the long history of the Reactor Licensees' use of the Telex equipment, there has not been a single reported case of interference.

The Reactor Licensees have endorsed the Commission's proposal in an earlier rulemaking to extend licensing eligibility under Subpart H of Part 74 of the rules to permit the use of low power auxiliary stations inside power plants.[7] The safe operations of the Reactor Licensees, as well as the reduction of employees' exposure to radiation, both of which are demonstrably enhanced through use of Telex equipment, are compelling public interest – and indeed public health – considerations, as the Commission clearly recognized in granting the Waiver and in suggesting Part 74 licensing for the Reactor Licensees' use of Telex headsets. The Reactor Licensees provided exhaustive operating information, as well as engineering data, which demonstrates the unique and compelling need for Telex headsets to support mission-

[5] *See* NEI/UTC Waiver Letter Order.
[6] *Id.* at 2

critical communications at the Reactor Licensees' facilities, especially during outages when many highly trained technicians operate in areas where higher levels of radiation are present.[8]

Like other eligible users under Part 74, the Reactor Licensees have a need to occasionally use this equipment outdoors, because the movement of the spent fuel, from containment to the storage facilities inside the fenced perimeter security area, is a critical evolution with significant safety implications. In their Petition for Waiver, and other filings, the Reactor Licensees have provided site-specific support for the need for outdoor use of this type of equipment. The Reactor Licensees consistently note the significant safety benefit of using the same communications assets from the start of the delicate and highly choreographed process of raising the fuel canisters from the spent fuel pools, which are often inside the containment building, removing them from the reactor building, and transporting them to the outdoor storage facility. The Reactor Licensees also point to the substantial value of Telex wireless headsets for crane and other heavy equipment operations in the switch yard, where the margin for error is too close to allow dropped or garbled transmissions.

II. Relief Requested.

A. Proposals in Earlier Proceedings.

The Reactor Licensees have participated actively in the various rulemakings related to wireless microphones, having filed Comments, Reply Comments, and Supplementary Comments

[8] NEI and UTC previously reported that as many as 1,500 workers are needed on-site during plant refueling operations, thus necessitating robust and clear wireless communications to coordinate the activities of these workers to ensure the safety of workers, the plant, and the public. See NEI/UTC *Ex Parte* filing in WT Docket Nos. 08-166 and 18-167, ET Docket No. 10-24, and GN Docket No. 12-268 (filed Jan. 10, 2014).

which are incorporated herein by reference.[9] In these filings, the Reactor Licensees have demonstrated that the Telex equipment is unique and extremely effective in handling communications that directly affect worker health and safe plant operation, despite this challenging setting. Through these filings, the Reactor Licensees have developed the record to demonstrate that there is no alternative equipment, with equivalent functionality (after testing 37 potential "alternatives") and, significantly, that the plants' use of the Telex headsets does not pose a risk of interference to other spectrum users.

In the *Second Report and Order*, the Commission declined to expand eligibility under Part 74 of the FCC's rules to include nuclear power plants, finding that such licensing was unnecessary at that time.[10] Instead of granting the request, the Commission modified the Waiver that was previously granted to nuclear power plants to use wireless headsets at variance from Part 15 of the FCC's rules and increased the Reactor Licensees' flexibility by allowing them to operate unlicensed wireless headsets at uniform power levels during both indoor and outdoor operations.[11] The Commission also declined to codify these waiver provisions in Part 15 at that time because there was no showing that this was necessary prior to consideration of changes to the Part 15 rules for unlicensed wireless microphone use.[12] Most significantly, the Commission found that operation of nuclear power plants' unlicensed low power auxiliary station devices outside at transmit levels up to 100 milliwatts "would not interfere with other users in these

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[9] Comments of NEI and UTC in WT Docket No. 08-166 (filed Mar. 1, 2010); Reply Comments of NEI and UTC in WT Docket Nos. 08-166, 08-167 and ET Docket No. 10-24 (filed Mar. 22, 2010); Supplementary Comments of NEI and UTC in WT Docket Nos. 08-166, 08-167, ET Docket No. 10-24 (filed Jan. 25, 2013).

[10] *See Second Report and Order* at ¶¶ 25-26.

[11] *See id.* (citing NEI/UTC Waiver Letter Order).

[12] *See id.*

bands because the locations of nuclear power plants are known, they generally are located in remote areas, and their Telex equipment operates at a relatively low power."[13]

B. Reactor Licensees' Current Request for Relief.

1. Continuation of the Special Waiver for Nuclear Power Plants

The same factors that led the Commission to grant the NEI/UTC Waiver Letter Order and expand flexibility for use of wireless headsets in nuclear power plants are still present today and will continue into the future. Specifically, there have been no complaints of interference from wireless headsets used by the Reactor Licensees, the locations of nuclear plants are known, the nuclear plants are generally located in remote areas, the headsets operate at relatively low power, and the headsets are still mostly used indoors where the plant structure further attenuates the signals to almost imperceptible levels at points inside most plants' security perimeter.

Therefore, to avoid uncertainty and to permit continued use of these wireless headsets, for which there are no alternatives offering equivalent effectiveness and reliability, the Reactor Licensees respectfully request the Commission to confirm that, following the Incentive Auction and the post-auction transition for the 600 MHz Band, nuclear power plants may continue to operate wireless headsets pursuant to the NEI/UTC Waiver Letter Order, as modified by the Commission in the *Second Report and Order*.

Although the original NEI/UTC Waiver Letter Order authorized use of "television frequencies below 698 MHz," the Reactor Licensees respectfully request clarification that they may continue to operate on all frequencies below 698 MHz that were available for television broadcasting as of the date of the NEI/UTC Waiver Letter Order. The Reactor Licensees have no way of knowing which of the frequencies they are currently using might be converted to wireless

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[13] *Id.*

broadband use in the future or how much spectrum will remain available to them for wireless headset operations.

Given the low power of the Reactor Licensees' headset operations, the readily identifiable and generally remote location of the plants, the lack of substitute communications systems that provide equivalent functionality, and the overriding non-interference condition on the plants' use of the headsets, the Reactor Licensees respectfully submit that no purpose would be served by limiting the waiver to whatever spectrum happens to remain for television broadcasting or guard bands in the area around the plants.

The Reactor Licensees recognize that the Commission has provided for a 39-month transition period, commencing with the release of the Channel Reassignment Public Notice, for licensed and unlicensed wireless microphones to cease operations in the repurposed 600 MHz Band.[14] However, the devices that are contemplated by that transition plan are generally highly mobile wireless microphones that are used in a wide variety of settings, such as theatres, sports venues, outdoor concerts, etc., where those uses may be transitory, uncontrolled, and difficult to identify if interference were to be detected. As discussed above, and as previously recognized by the Commission, the locations of nuclear plants are well known, and the use of low power wireless headsets, even outdoors, is highly unlikely to cause interference to other licensees.[15]

Moreover, because of strict operating conditions with respect to electronics inside nuclear plants, (including but not limited to the simultaneous operation of dosimeters, to quantify and manage worker dose exposure), and the fact that security requirements preclude use of other

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[14] *See Part 15 NPRM* at ¶ 18 (citing *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, GN Docket No. 12-268, Report and Order, 29 FCC Rcd 6567, ¶ 687 (rel. June 2, 2014) ("*Incentive Auction R&O*").

[15] *See e.g.*, NEI/UTC Waiver Letter Order

non-authorized wireless devices in the plants altogether, there are no currently identifiable equipment options or frequency alternatives for the plants to use in order to accomplish these essential communications operations, following the expiration of the 39-month transition period. As such, the 39-month transition period does not include the prospect for a long-term solution to the plants' communications requirements.[16]

In recognition of the need for the Commission to maximize the value of the repurposed 600 MHz Band, following the transition period, the nuclear plants can limit their use of the repurposed broadcast spectrum to *indoor operations only.*

The Reactor Licensees need this regulatory flexibility because, as noted above, at this time, the Reactor Licensees cannot know how much of the television broadcast spectrum will be lost to the Incentive Auction and thus cannot plan for a reliable transition that will promote safe plant operations and minimize worker exposure to radiation. The Reactor Licensees have already implemented a transition from the 700 MHz band, and thus the nuclear plants are working with more limited spectrum than previously available for these operations.

Given frequency separation requirements as between Telex headsets operating within a plant, a further reduction in available spectrum threatens the ability of the Reactor Licensees to simultaneously operate the number of handsets necessary for all of the operations that must be conducted during outage operations. As noted below, the experience of the Reactor Licensees in testing the operation of Telex handsets that operate with narrower bandwidth channels has been a

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[16] The Reactor Licensees look forward to reviewing the comments of device manufacturers in response to the *Wireless Microphone NPRM*, but as of now, the Reactor Licensees are not aware of any manufacturers proposing to develop new equipment designed to meet the same operating criteria for which the Telex equipment has proven to be well-suited. Until any alternatives are available and tested for use in the heavily-controlled and regulated nuclear environment Telex is the best solution.

degradation in audio quality. While a garbled word at a theatrical production could cause embarrassment, an unclear or lost instruction inside a nuclear plant could be much more impactful.

For all of these reasons, the Reactor Licensees respectfully urge that nuclear power plants should not be compelled to cease indoor operations in the repurposed 600 MHz Band at the end of the general 39-month transition period. Given the importance of these headsets to worker health and plant safety, their extremely low potential for causing interference, and the condition that the devices may not, in fact, cause interference, no purpose would be served by compelling the plants to terminate their operation by that deadline.[17]

2. Definition of "Unlicensed Wireless Microphone"

With respect to the Commission's proposed revision of the definition for "unlicensed wireless microphones" under Part 15 rules,[18] the Reactor Licensees request that the definition of "unlicensed wireless microphone" be expanded to clearly include the Reactor Licensees' wireless headsets (used by the nuclear power plants for bi-directional audio communications between and among personnel). The technical specifications for the most commonly used Telex headsets are found at Attachment B hereto. As proposed, the definition could be interpreted as only including headsets that are used in connection with video or audio productions. However, the Reactor Licensees' headsets are also used for "cue and control" communications in connection with complex maintenance and repair operations as well with the movement of personnel and materiel at nuclear power plants. Reactor Licensees must be included as among

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[17] *See, e.g.,* 47 C.F.R. §§101.79 and 101.95 (allowing continued use of incumbent microwave communications systems beyond a defined transition period until specifically notified by a new licensee of the need to relocate).

[18] *See Part 15 NPRM* at ¶ 148.

those eligible to use this equipment, as well as future equipment that may be developed to meet this need, pursuant to the new Part 15 rules.[19]

3. Eligibility for Licensing Under Part 74

Although the Commission earlier did not extend to nuclear power plants eligibility for licensing under Part 74, pending the completion of its further rulemakings on wireless microphones, the Reactor Licensees respectfully renew their request to be afforded such eligibility. As previously demonstrated, the public interest in ensuring reliable communications at nuclear power plants is at least as compelling as the other categories of users that have been afforded eligibility to license frequencies for wireless microphone and headset operations.[20]

III. The Unique Circumstances and Proven Record of Non-Interference Support Permitting the Plants to Continue to Use Telex Equipment.

As the Reactor Licensees have explained in earlier Commission filings, including but not limited to the Petition for Waiver, which are hereby incorporated by reference,[21] the 61 sites where the 100 operating nuclear plants are located are in largely rural areas, on sites ranging in size from 400 to 1,400 acres. Much of the use of the Telex equipment is in portions of the Reactor Licensees' buildings that are underground and often adjacent to major equipment, including huge cooling tanks of water which, together, further attenuate these 50 – 100 mW signals. In addition, the Reactor Licensees' use of the Telex equipment is intermittent and periodic, concentrated during refueling outages when, among other maintenance and refurbishing

[19] NEI and UTC also urge that proposed restrictions on the marketing and sale of wireless microphone equipment operating in the bands at issue be qualified to permit the supply of such equipment to the Reactor Licensees specifically for and consistent with the waiver relief under which they would be permitted to continue to operate.

[20] *See* Supplemental Comments of NEI and UTC in WT Docket Nos. 08-166 and 08-167, and ET Docket No. 10-24, filed January 25, 2013, at 5-7.

[21] *See* Petition for Waiver.

activities, spent nuclear fuel is removed and replaced with fresh fuel. These outages usually last approximately 25-40 days, and most often *occur only once every 18 – 24 months.* [22]

Moreover, the signals from the Telex equipment have a negligible potential to cause interference beyond the plants' security perimeter.[23] Propagation studies in 2011 at two nuclear plants confirmed that signals from Telex equipment used indoors drops to below the maximum field strength for Part 15 intentional radiators (200 μVm) within 91.4 meters (300 feet) of the plant walls, and well within the security fencing around plant property.[24] In 11 years of operating on a secondary basis in the broadcast bands, the Reactor Licensees have not received a single report of interference, nor has there been even one incident when a broadcast signal affected the Reactor Licensees' use of the Telex equipment. As such, interference need not be a concern when considering this request for reasonable regulatory flexibility.

IV. The Reactor Licensees Efforts to Seek Equipment Alternatives Have Failed.

In addition to testing thirty-seven (37) potential equipment alternatives, the Reactor Licensees have even sought-out developers at another major supplier of private land mobile radio equipment who initially expressed interest, until they learned that the market was limited to just 104 facilities, using perhaps 15 – 20 base stations and 60 – 70 headsets each. NEI and UTC

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[22] Planning for a refueling operation, including the specific communications systems necessary to the operation, typically commences many months in advance of the refueling operation itself due to the need to identify and eliminate all potential risks through very precise and highly choreographed maneuvers.

[23] *See* NEI/UTC Ex Parte presentation in WT Docket Nos. 08-166 and 08-167, and ET Docket No. 10-24, filed February 24, 2011.

[24] *Id.* These more recent studies confirmed an earlier study, conducted in 2005, on the extremely low probability that use of Telex headsets at nuclear plants could interfere with devices located outside the plants' security perimeter. See Declaration of T. Fred Short, Electrical Engineer and Consultant for Exelon, Attachment C hereto. These predictions have borne out because, as noted earlier, there have been no reported cases of interference from the plants' use of Telex headsets.

were informed that the Reactor Licensees are simply not a large enough commercial "market" to justify the investment of time and money required for the manufacturers to develop a new product that could meet the Reactor Licensees' unique requirements.

Telex has recently started selling its BTR 80N, which requires less bandwidth per channel. This enables the BTR 80N to be capable of fitting into narrower frequency blocks and, also, the BTR 80N can support nearly twice as many belt-packs as the earlier versions of the Telex equipment. However, over half of the Reactor Licensees observed a material degradation of the audio fidelity, as a result of the BTR 80N's narrowband technology. Even if the loss of audio quality were not objectionable, the BTR 80N is only a part of a solution; without the requested Part 15 waiver codification or, in the alternative, eligibility under Part 74 of the FCC's rules eligibility, the Reactor Licensees will not have access to adequate spectrum to meet their communications requirements. In any event, the Reactor Licensees have no way of knowing whether Telex will adapt the BTR 80N to comply with the new rules in this proceeding, and if so, whether that equipment as reconfigured will be adequate for use at nuclear power plants.

V. The Surveys of Reactor Licensees' Use of Telex and Testing of Potential Options.

NEI and UTC have been diligent in exploring potential alternative communications devices that could at least come close to providing the type of reliable, durable, hands-free wireless communications services offered by Telex. To that end, in 2005, 2008 and again in the fall of 2012, NEI undertook comprehensive surveys of its member Reactor Licensees to determine if they still relied on Telex equipment and whether any of the alternatives they tested had been found to be appropriate replacements. The surveys demonstrate that the functionality of the Telex equipment is still the most effective way to manage the communications requirements in and around the nuclear plants and also meet NRC requirements to keep worker

radiation dose exposure "as low as reasonably achievable" ("ALARA"). The fact that this equipment operates in the VHF and UHF bands enables the Reactor Licensees to operate simultaneously with the 2.4 GHz dosimeters that measure dose exposure and which must be worn by each worker simultaneously with the Telex equipment during outages and maintenance functions in areas with radiation. In summary, NRC's ALARA requirement is served by managing worker safety through accurate communications, which, in turn, allows efficiency in accomplishing tasks in high radiation areas.

Furthermore, operation of the Telex equipment in the VHF and UHF bands avoids "multipath" interference and "reflected signal" from the domed ceilings of the containment buildings. The domed ceilings often interfere with or weaken the functionality of systems operating on other frequencies. In this environment, these wireless headsets also enable outstanding coverage and audio clarity that blocks background noise unlike any other equipment tested by the Reactor Licensees.

Also of importance, the Telex headset's design and functionality enables multiple headsets to be used simultaneously and allows workers dressed in heavy protective gear, including gloves, to manage the units in a hands-free manner. The plants also point to the fact that Telex equipment is far more durable than the alternatives, proving able to withstand the harsh industrial environments of the nuclear plants.

Overall, the survey results uniformly confirm that Telex provides the most reliable communications devices – especially for indoor operations – for the plants, thereby facilitating communication that reduces worker dose and promotes safe plant operations.

VI. Conclusion.

The Reactor Licensees respectfully request that the Commission confirm that nuclear plants may continue to operate wireless headsets pursuant to the NEI/UTC Waiver Letter Order, as modified by the Commission in the *Second Report and Order*. In doing so, the Commission will again address the unique challenges associated with nuclear plant communications, as well as the lack of alternative equipment that can deliver equivalent levels of functionality as that found in the Telex equipment.

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In addition, the FCC's definition of unlicensed wireless microphone must be expanded to include the Telex headsets in order to permit the Reactor Licensees to meet their mission-critical communications requirements, and the Reactor Licensees must be eligible to operate future equipment, as it is developed, on at least the same basis as other users of wireless microphones and headsets. Only with this range of modest regulatory relief in place will the Reactor Licensees be able to find enough spectrum to maintain their current operations and thereby promote worker health and safe plant operations.

Respectfully submitted,

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February 4, 2015

ATTACHMENT A

Federal Communications Commission
Washington, D.C. 20554

October 1, 2010

DA 10-1909

Mr. J. Jeffrey Craven
Thompson Coburn LLP
1909 K Street N.W., Suite 600
Washington, D.C. 20006-1167

Subject: Request to Modify Conditions on Waiver Granted in ET Docket No. 10-24

Dr. Mr. Craven:

This is in response to your letter dated September 23, 2010 requesting a modification of the waiver that permits the operation of low power auxiliary devices without a license in the television band on frequencies below 698 MHz. You state that this modification is needed to permit the use of Telex headsets within nuclear power plants in those instances where all of the terms of the waiver are not satisfied.

On January 14, 2010 the Commission adopted a Report and Order and Further Notice of Proposed Rulemaking addressing the use of low power auxiliary devices in the television bands.[1] In the Report and Order, the Commission granted a waiver of its rules to permit such devices to operate within the television bands on an unlicensed basis on frequencies below 698 MHz until additional rules are adopted. In order to qualify for the waiver the low power auxiliary devices must meet a number of conditions including: 1) the transmitted power is limited to 50 mW; 2) the devices must maintain a specified separation distance from co-channel television transmitters; and 3) the equipment must be certified to meet the Commission's Part 74 technical standards.

In your letter you state that nuclear power plants have clearly established that they have a need to use the Telex headset systems and that a limited modification of the waiver is needed to protect plant workers from radiation and to preserve safe plant operations. You note that a significant number of plants are not able to meet the separation distance from television transmitters required by the waiver for a large portion of their equipment. You state that from 2007-2010 the plants have used the Telex equipment under a consensus plan endorsed by NAB, MSTV, and SBE and that there has not been one allegation of interference. The consensus plan permitted indoor operation at up to 100 milliwatts with no frequency coordination.

It is a well-established principle that the Commission will waive its rules in specific cases only if it determines, after careful consideration of all pertinent factors, that such a grant would serve the public interest without undermining the policy the rules are intended to serve. *See WAIT Radio v. FCC*, 418 FCC F.2d 1153 (D.C. Cir. 1969). Furthermore, in the January 15, 2010 Report and Order the Commission explicitly delegated authority to the Office of Engineering and Technology and the Wireless Telecommunications Bureau to modify the waiver on a case-by-case basis to permit entities to operate

[1] Revisions to Rules Authorizing the Operation of Low Power Auxiliary Stations in the 698-806 MHz Band, *Report and Order and Further Notice of Proposed Rulemaking*, 25 FCC Rcd 643 (2010).

low power auxiliary devices at power levels higher than 50 mW where it can be shown there is no significant risk of harmful interference to other users of the spectrum. Modifying the waiver conditions to allow use of Telex headsets inside nuclear power plants will serve the public interest by ensuring that personnel working inside these plants have essential equipment for critical communications.[2] In granting this modification of the waiver conditions we recognize that these devices employ relatively low power and nuclear power plants are physically separated from receivers that could potentially receive interference. The potential for interference will be further reduced by the fact that the modification that we are granting here will permit operation of the Telex headsets only inside of buildings at the nuclear power plants. As you note, Telex headsets have been used at nuclear power plants for over six years without any reported case of interference.

Accordingly, pursuant to authority delegated in sections 0.31 and 0.241 of the Commission's rules, 47 C.F.R. §§ 0.31, 0.241, and section 1.3 of the Commission's rules, 47 C.F.R. § 1.3, the waiver granted in WT Docket Nos. 08-166 and 08-167 and ET Docket No. 10-24 on January 14, 2010 to permit use of unlicensed low power auxiliary devices in the television bands is modified as follows. The use of low power auxiliary devices will be permitted on television frequencies below 698 MHz inside of nuclear power plants subject to following terms and conditions:

1) Such devices shall be limited to a transmit power of 100 mW.

2) Such devices shall only be operated within buildings.

3) Such devices may be operated without regard to the television station co-channel separation distances specified in the waiver granted on January 10, 2010.

4) Such devices in all other ways must comply with the terms of the waiver granted on January 14, 2010 in ET Docket No. 10-24.

If you have any further questions, please contact Nicholas Oros, Spectrum Policy Branch, Policy and Rules Division, via email at Nicholas.Oros@fcc.gov or via phone at (202)418-0636.

Sincerely,

Julius Knapp
Chief
Office of Engineering and Technology

Ruth Milkman
Chief
Wireless Telecommunications Bureau

[2] The Nuclear Energy Institute and Utilities Telecom Council have previously stated that there are no suitable alternative means of communication. *See* Reply Comments of the Nuclear Energy Council and Utilitites Telecom Council, WT Docket 09-174, ET Docket 05-345, filed Nov. 5, 2009, at 11-15.

ATTACHMENT B

TELEX RadioCom Wireless that Works

BTR-800

UHF Two-Channel Wireless Synthesized Base Station

The Telex RadioCom BTR-800 UHF-synthesized wireless intercom systems offer the ultimate in reliable, high-performance, high fidelity full-duplex communications. The BTR-800 system includes the BTR-800 frequency-agile base station, working with up to four TR-800 or TR-825 frequency-agile beltpacks. The BTR-800 base station provides full-duplex communications with the beltpacks.

The BTR system incorporates two audio channel operation, permitting the beltpack operator to choose between two separate audio channels of communications, with the base station tracking the beltpack selection. This allows the user the flexibility to create a party line and a private line within the same beltpack.

The BTR-800 system is perfectly suited for stand-alone operation and can interface with Telex Audiocom, RTS Two-Wire Intercom, Clear-Com as well as RTS Digital Matrix Intercom systems and other four-wire communications systems. In addition to the external intercom systems interfaces listed above, the system provides connections for auxiliary balanced audio input and output, as well as wireless talk-around (WTA) and stage announce (SA) features.

The Telex RadioCom BTR series has been designed for reliable, efficient operation. Operating in the 470 to 740 MHz range, the units operate reliably at line-of-sight distances of 1,000 feet. With available antenna systems, from Telex RadioCom, the effective operating range can be extended. The high-efficiency beltpacks provide up to 12 hours of uninterrupted operation using standard alkaline batteries.

Features

Frequency-Agile Base Station & Beltpacks

Backlit Base Station LCD

ClearScan Function

Full-Duplex Operation

Compatible with Audiocom, RTS TW, Matrix, Clear-Com, and other wired intercom types.

Two Channels of Intercom Audio

WTA (Wireless Talk About) Beltpack Control

SA (Stage Announce) Beltpack Control

Relay contract closure on the base when the SA button is pressed

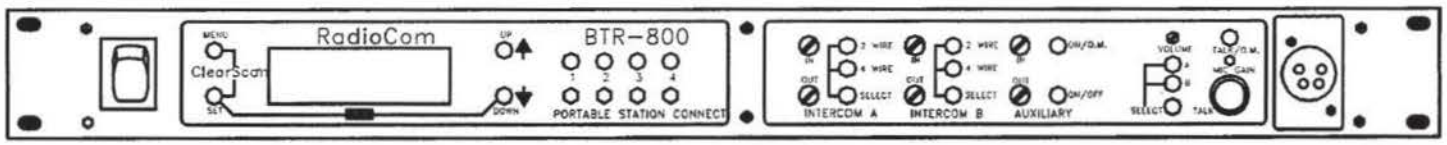
TR-825 features two audio channel binaural operation in either stereo or mono mode

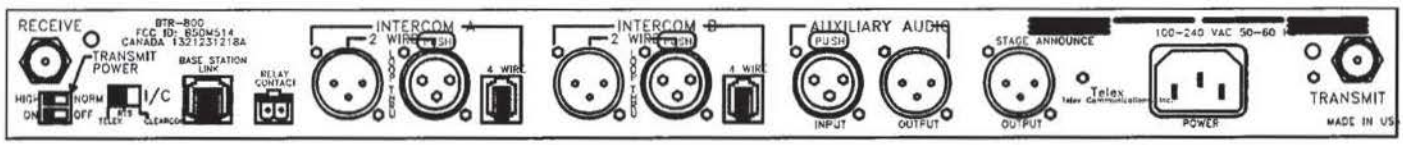
Beltpack units contained in a weather and shock resistant die cast magnesium case

Convenient IEC power connector on the base station.

Base station comes with rack ears for easy rack mounting.

Line Drawing





BTR-800 Specifications

Overall

RF Frequency Range
470 - 608 MHz, 614 - 740 MHz in 18 MHz TX and RX bands
Power Requirements
100-240 VAC, 50-60 Hz, IEC receptacle
Temperature Range
-4°F to 130°F (-20°C to 55°C)
TX Antenna
½ Wave (supplied), TNC Male Connector
RX Antenna
½ Wave (supplied), TNC Male Connector
FCC ID
B5DM514
Frequency Response
300 Hz-8 kHz
4-Wire Input and Output
Level Adjustable (2 Vrms typical)
Telex RadioCom Intercom
Input/Output Level Adjustable (1 Vrms typical), Line Impedance 300Ω
RTS Intercom
Input/Output Level Adjustable (0.775 Vrms typical), Line Impedance 200Ω
Clear-Com Intercom
Input/Output Level Adjustable (1 Vrms typical), Line Impedance 200Ω
Auxiliary Input
Adjustable (2 Vrms typical)
Auxiliary Output
Adjustable (2 Vrms typical into 600Ω)
Stage Announce Output
Internally Adjustable (2 Vrms typical at rated deviation into 600Ω)
Stage Announce Relay
Dry contact, rated at 1 Amp, 24V Max
Microphone Input Sensitivity
9 mV
Local Headset Output
40 mW output into 600Ω (1% Distortion)

Transmitter

Type
Two Synthesized Transmitters, 712 channels each
Transmit Power (each transmitter)
100 mW Max. (High), 10 mW (Normal)
Modulation Type
FM
Deviation
40 kHz (35 kHz Europe)
RF Frequency Stability
0.005%
Modulation Limiter
Peak-Responding Compressor
Radiated Harmonics & Spurious
Exceeds FCC specifications

Receiver

Type
Dual Conversion Superheterodyne, four Independent Synthesized IFs, FM, 712 channels each
RF Sensitivity
<0.8 µV for 12 dB SINAD
Squelch Threshold
20 dB SINAD
IF Selectivity
3 dB at 230 kHz
Image Rejection
70 dB or better
Squelch Quieting
90 dB
RF Frequency Stability
0.005%
Distortion
<1% at full deviation

Product Dimensions/Weight

BTR- 800
19"W x 1.72"H x 14"D (48.3cm x 4.4cm x 35.6cm), 7 lbs 2 oz (3.24 kg)

Shipping Dimensions/Weight

BTR- 800
17"W x 5"H x 23"D (43.2cm x 12.7cm x 58.4cm), 12 lbs (5.43 kg)

Contact Information
Telex Communications, Inc.
12000 Portland Avenue South
Burnsville, Minnesota 55337
Telephone: 877-863-4169
Fax: (800) 323-0498

Form Number: LIT000270000 Rev A
Date: August 2008

Ordering Information

BTR-800 • UHF Two-Channel Wireless Synthesized Base Station with A4M headset jack • Catalog Number: 71305XX

BTR-800-RTS • UHF Two-Channel Wireless Synthesized Base Station with A4F headset jack • Catalog Number: 71305XXR

BTR-800-RTS 5-Pin • UHF Two-Channel Wireless Synthesized Base Station with A5F headset jack • Catalog Number: 71305XXR5

ATTACHMENT C

SPECIAL
SYSTEM
SERVICES

1 Wayne Circle
Lower Gwynedd, PA
19002

Office (215) 699-4427
FAX (215) 699-4427

March 3, 2005

Federal Communications Commission
Wireless Telecommunications Bureau
1270 Fairfield Road
Gettysburg, PA 17325

To Whom It May Concern:

On March 02, 2005 the Exelon Generation Company conducted tests on the Telex model BTR-700 (Base unit) and the TR-700 (Head set unit) at the Limerick Nuclear plant in Limerick, PA. The purpose of the testing was to identify the range of the units and to verify the proximity of the plant parimeter to any possible entity that may be subject to interference.

The units operate at a maximum of 50 mw of output power. The base unit was set up outside on a table, free of obstructions, on the Limerick Nuclear plant property. A Hewlett Packerd Spectrum analyzer was set up in a van with a magnetic mount antenna on the roof (about 6 feet above the ground). We first tested the base unit at intervals of 0.1 miles until signal was lost. We then repeated the test with the headset. This time the Spectrum analyzer was placed on the table with the base and the headset signal strength was measured as we drove away. The head set antennas were placed on the outside of the van window, toward the test location. There were no obstructions between the base and the van during the testing.

Test results:

Distance		Frequency 522.3 MHz Base Signal strength		Frequency 632.7 MHz Headset Signal strength	
(ft.)	(meters)	(dBm)	(uv/m)	(dBm)	(uv/m)
10	3.048	-40	2236.067	-50	707.106
528	160.9	-80	22.36	-90	7.071
1056	321.9	-100	2.236	-100	2.236
1584	482.8	-105	1.2571	-108	0.89
2112	643.7	-110	0.707	-114	0.446

Conclusion :

The signal strength from the base and headset decreases to the noise level of between -110 and –114 dBm where communications is lost between units. This occurs at a distance of about 2000 feet. No homes or businesses are located within a 2000 foot parimeter of the plant property boundry. Any communications within the plant or even within the plant boundry would not produce a signal strength which could be heard outside the plant property. Tests within the plant were cancelled because every building would further attenuate the signal by between 10 and 20 dBm and we loose signal from the parimeter test position before we reach the plant buildings.

The full duplex headsets are essential to the safety and support of the plant activities and none of the operations has been the subject of interference complaints.

Respectfully,

T. Fred Short, Electrical Engineer and Consultant for Exelon

DECLARATION

I, T. Fred Short, am an Electrical Engineer at Special System Services ("SSS"), 1 Wayne Circle, Lower Gwynedd, PA 19002. SSS serves as a Consultant for Exelon, a nuclear plant owner that utilizes Telex equipment for certain communications needs. I hereby declare the following to be true under the penalty of perjury.

1. I am the author of the SSS letter dated March 3, 2005 (the "Letter") which the Nuclear Energy Institute submitted to the FCC as part of its request for waiver, in which I described the real-world testing of Telex equipment's signal strength when operated at and around nuclear plant buildings.

2. As a consequence of the testing described in the Letter, I am familiar with both the signal strength and the attenuation characteristics of the Telex equipment, in the context of a nuclear plant.

3. I am also familiar with the types of buildings that generally house training centers used by nuclear plants. Inside these training centers are the simulators that are used to train plant staff on the use of equipment, including the Telex equipment.

4. Based upon my knowledge and expertise, including the information obtained during the testing described in the Letter, the signal strength of Telex equipment, operated at 50 mw of output power inside a plant training center, would be reduced to one-quarter of its non-obstructed path strength as it passes through the building wall, to the outdoors. Accordingly, the signal from the base station and headset operated inside a training center would travel no further than 500 feet outside of the building, from the point nearest the Telex equipment operation.

Respectfully submitted,

T. Fred Short 09/09/05

T. Fred Short
Electrical Engineer
Consultant for Exelon